Flathead Lake East Shore/West Shore Corridor Study Summary Report/

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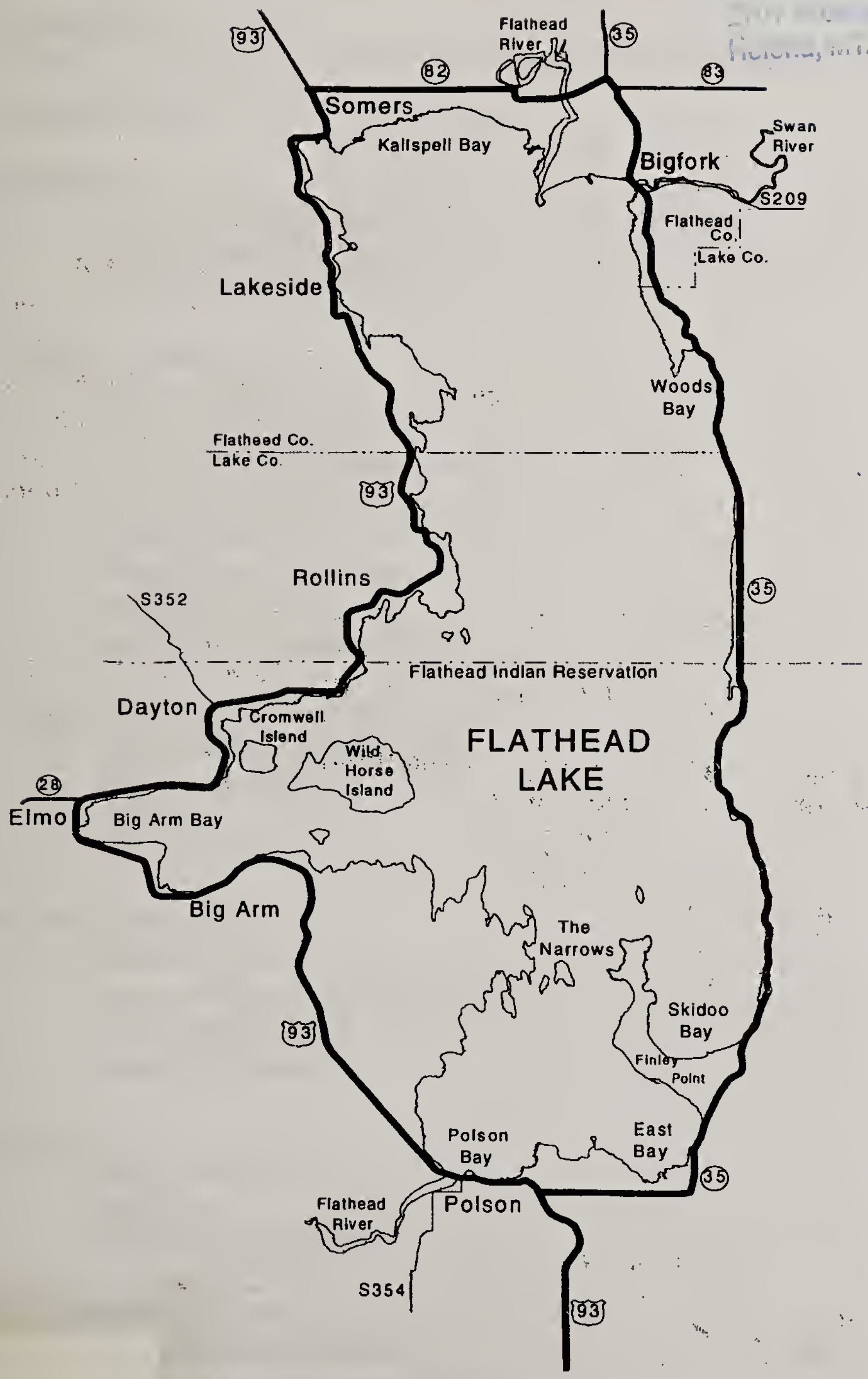
FLATHEAD LAKE EAST SHORE / WEST SHORE CORRIDOR STUDY SUMMARY REPORT



prepared for the
Montana Department of Transportation
Highway Planning Bureau
MDT

prepared by
Robert Peccia & Associates
Helena, Montana

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PURPOSE & METHODOLOGY

Highways US 93, Montana 35, and Montana 82 encircle Flathead Lake in northwestern Montana. These highways provide access to local land, and serve as major travel corridors along the lake for private, commercial, and recreational traffic. The corridor is an important route for regional travel, access between local communities, and access to Glacier National Park and numerous other recreational attractions in western Montana. Growth in population and tourism in the Flathead Valley have led to more traffic on each of these highways, and increased pressure on the roadway system's capacity. These changes have had and will continue to have corresponding effects on traffic safety, air quality, noise, and other environmental resources.

In response to this growth and its effects on traffic conditions and the surrounding environment, the Montana Department of Transportation (MDT) commissioned a study of transportation in the Flathead Lake east shore / west shore corridor. The purpose of the study was to develop a factual database for use in future decision making for the east and west shore highways around Flathead Lake. Information gathered in this project was to provide a basis for agreement on conditions, use, and other issues related to the transportation corridor.

The study was conducted between December 1992 and October 1993 by an independent consultant, Robert Peccia & Associates Inc. (RPA) of Helena, Montana. MDT chose to utilize the services of an outside consultant to complete the study in order to ensure objectivity in the required analyses and evaluations. MDT design files, reports, and statistics programs were reviewed to obtain baseline information regarding roadway geometrics, traffic volumes and characteristics, accident statistics, vehicle characteristics, highway access, right-of-way conditions, and maintenance activities.

MDT's information was supplemented with data from other state, local, and federal agencies. Data was also collected independently by the consultant as part of this project from January 1993 through August 1993, to verify and supplement the existing information. RPA inventoried roadway features, obtained automatic traffic counts at several locations around the lake, conducted vehicle classification studies, counted bicycle and pedestrian traffic, observed traffic speeds, and performed travel time studies. Through their subconsultants, RPA also inventoried biological, environmental, cultural, and historical resources around the lake and within the vicinity of existing or possible future roadways.

Once collected, all of the information available for the project area was critically analyzed to determine existing conditions and estimate future conditions. Recommendations were then developed to guide future management of the transportation system, and specific roadway improvements were suggested. Finally, all data, analysis, conclusions, and recommendations were compiled into an easily accessible technical manual for future reference.

This report summarizes the process and some of the most important results of this study. Complete documentation of the project and its results are contained in the Montana Department of Transportation's October 1993 ***Flathead Lake East Shore / West Shore Corridor Study Technical Reference Manual.***

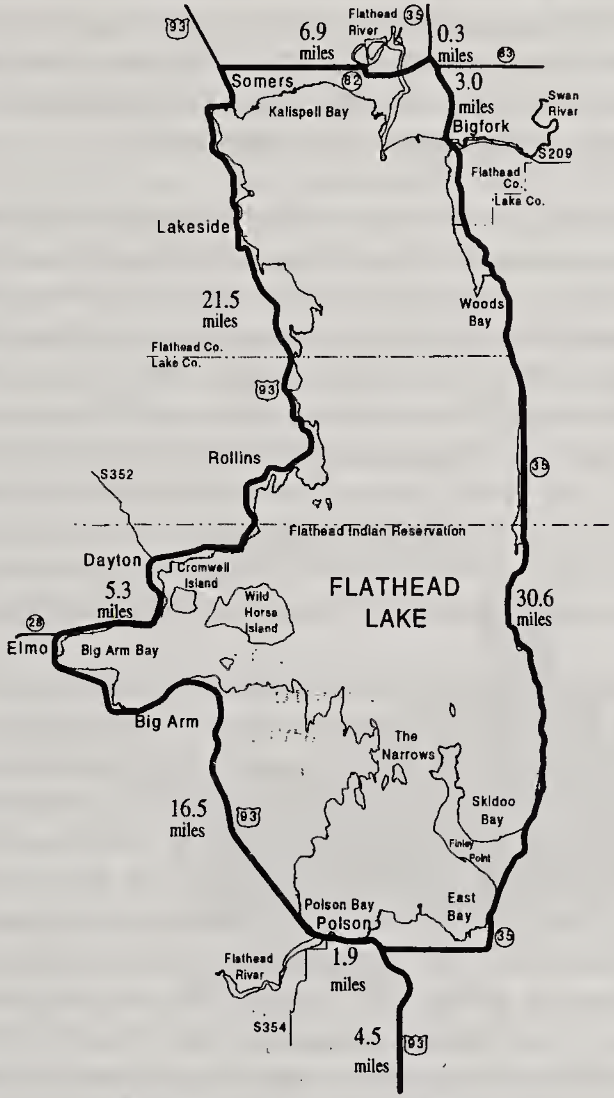
PROJECT AREA DESCRIPTION

The project addresses portions of Montana Highway 35, Montana Highway 82, and US Highway 93 where they lie along the shorelines of the Flathead Lake, in western Montana. The project area begins on US 93 just south of Polson, at milepost marker 54. It extends to the north along highways 35 and 93, and across the northerly edge of Flathead Lake on Montana Highway 82, ending at the highway 35/82 and 93/82 junctions. In all, the project covers about 91 miles of Montana's primary highway system.

The west shore corridor consists entirely of US Highway 93. It passes through the communities of Polson, Big Arm, Elmo, Dayton, Rollins, Lakeside, and Somers. Its length within the project area includes five miles south of the MT 35 junction at Polson, and 45.2 miles from the MT 35 junction north to its junction with MT 82.

The west shore route (between junctions) includes 34.5 miles in Lake County (27.4 miles of highway within the Flathead Indian Reservation), and 10.7 miles in Flathead County. This corridor provides a 47.4 mile connection between Kalispell and Polson, and a 65.5 mile connection between Columbia Falls and Polson.

The west shore corridor experiences an overall elevation change of about 700 feet (from highest point to lowest point) within the study area. 60.4 percent of its length has gradients below 3% (3 feet vertical change within 100 feet horizontal distance), 31.9 percent has 3-6% gradients, and 7.7 percent has grades over 6%. The roadway is primarily a two-lane facility, although it has four northbound and two southbound passing lanes. Its width varies from 28 to 59 feet across.



Mileage Summary:

	West Shore Corridor	East Shore Corridor
Polson - Kalispell	47.4 miles	46.5 miles
Polson - Columbia Falls	65.5 miles	57.4 miles

About 30% of the west shore roadway has been constructed or reconstructed within the last ten years, and an additional 42% of its length has had other minor improvements in that time. The route has three bridges (1,657 feet total length), crossing the Flathead River, a stockpass, and Dayton Creek. The route is designed and posted for 55 mph traffic.

The east shore corridor consists of Montana Highway 35 from its junction with US 93 at Polson to its junction with MT 82 north of Bigfork, and the portion of MT 82 from MT 35 to US 93. It passes through the communities of Yellow Bay, Woods Bay, and Bigfork. Its length within the project area includes 33.9 miles on MT 35, and 6.9 miles on MT 82, for a total length of 40.8 miles. The route includes about 28.2 miles in Lake County (18.0 miles within the Flathead Indian Reservation), and 12.6 miles in Flathead County. The corridor provides a 46.5 mile connection between Kalispell and Polson, and a 57.4 mile connection between Columbia Falls and Polson.

The east shore corridor experiences an overall elevation change of about 250 feet (from highest point to lowest point) within its length. 77.5 percent of the route has gradients less than 3%, 17.5 percent has 3-6% gradients, and 5.0 percent has grades over 6%. The roadway is entirely a two-lane facility, with roadway widths varying from 24 to 26 feet. None of this roadway corridor has been constructed or reconstructed within the last ten years, but almost 82% of its length has had minor improvements within that period. The route has two bridges (906 feet total length), crossing the Swan River and the Flathead River. Most of the route is posted with 50 mph speed limits, although lower speeds are required in several locations due to adjacent development, sharp curves, or limited sight distance.

PUBLIC INVOLVEMENT

As an integral part of the project, RPA involved the public in the data gathering efforts by discussing highway conditions with a variety of local agencies, groups, and individuals. This process was designed to ensure that the public was aware of the study being conducted, and allowed to participate in its development. The public's knowledge of these highways, and their desires and opinions about future development were considered integral components of the factual database, and were included in the process to ensure that future planning would adequately address them.

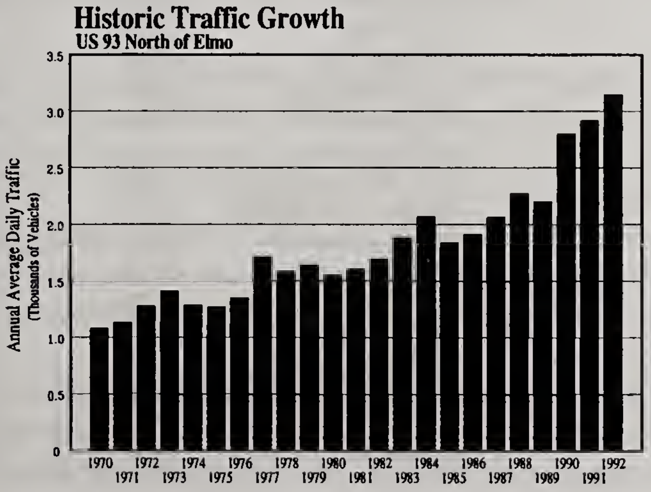
The public involvement process included an introductory mailing, personal visits, and phone calls to selected individuals, followed by follow-up mailings where needed. Those contacted included state, county, and city officials; chamber of commerce officials; tourism and economic development associations; officials of the Confederated Salish & Kootenai Tribes of the Flathead Nation; school districts; postal carriers; commercial transportation companies; and other interested individuals.

This summary report completes the initial public involvement process for this project by providing feedback and summarized results of this study to interested individuals, agencies, and other groups. The technical report for this study also recommends continuing public involvement activities as part of any future planning efforts for this transportation corridor.

TRAFFIC VOLUMES

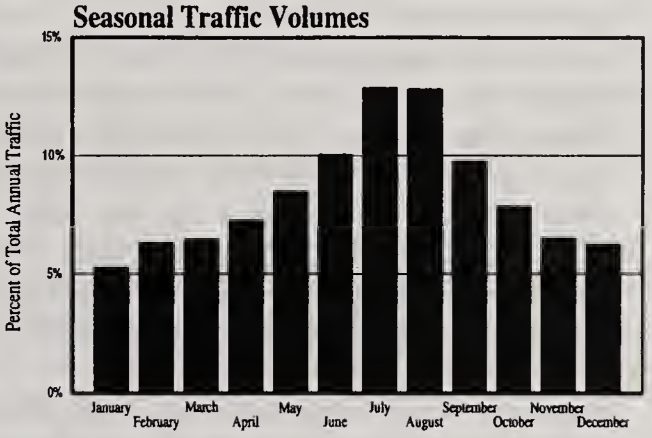
The Montana Department of Transportation regularly collects traffic volume statistics at sixteen locations within the project area. A permanent automatic counter is located on US 93 just north of Elmo. It collects 15 minute traffic count totals, 24 hours per day, 365 days per year. MDT uses temporary surveillance counters to collect similar information four times each year at the other fifteen locations around Flathead Lake.

This information is used to track and forecast growth, plan needed improvements, justify expenditures, and correlate with other related information such as accident statistics and environmental impacts. MDT's data shows that traffic levels on MT 82 and US 93 have grown at about 4½% per year for the last twenty years, effectively doubling every sixteen years. Traffic levels on MT 35 have grown at about 5% per year over this same period, effectively doubling every fourteen years. Both of these rates are significantly higher than the statewide average growth rate for this period, which has been about 3.2% per year. This relationship is directly comparable with recent population growth in the Flathead Valley as compared to the rest of the state.



MDT's traffic counting program shows that traffic levels are highest at the north and south ends of the lake. Traffic levels are lowest near the county line at the center of the lake. US 93 has the higher traffic levels, with daily totals ranging from 2,300 to 9,800 vehicles per day (annual average). MT 35 traffic levels range from 1,700 to 5,200 vehicles per day, and MT 82 from 3,300 to 3,600 vehicles per day (also annual averages).

MDT's traffic data also shows that traffic levels vary by season throughout each year. This common trend results in the highest traffic levels during summer months and the lowest in winter. MDT's data shows that state highway traffic levels in the general vicinity of this project peak in July and August at about 150-155% of the annual average monthly traffic. The lowest levels occur in December and January, at about 65-75% of the annual average.



SOURCE: 1991 Automatic Counters
(Average of Permanent Counters: A-62,A-24,A-60 & A-8)

US 93 traffic peaks on Fridays, followed by Saturday and Sunday, with slightly lower totals on Monday through Friday. MT 35 and MT 82 traffic levels are believed to follow the same pattern. This indicates that recreational travel makes up a significant portion of the total traffic using this corridor. (Traffic levels in areas dominated by commercial and/or commuter traffic normally peaks Monday through Friday.)

Because traffic counts are summarized every fifteen minutes, the data also shows hourly variations. For both weekdays and weekends, traffic in this corridor begins at low levels in early morning hours. Traffic levels typically begin climbing at about 6:00 AM, reaching a morning peak around 11:00 AM. Traffic levels remain relatively constant through the early afternoon, climbing to slightly higher levels by about 5:00 or 6:00 PM. Traffic then drops off through the evening, returning to minimum levels by about 1:00 AM or 2:00 AM. The times and amounts of hourly peaking vary by location, indicating varying proportions of commuter, commercial, and recreational travel.

In order to verify the MDT's data, Robert Peccia & Associates placed four automatic traffic counters at selected locations around the lake in July and August of 1993. Fifteen minute count totals were collected for weekdays and weekends, and then used for comparison against MDT's count data. The independent counts, when factored for annual growth and seasonal variations, generally corresponded with current MDT counts and projections from older MDT counts.

Based on MDT's historical and current traffic counts, RPA's current counts, and population and demographic information (discussed later), future traffic volumes were projected for the years 2000 and 2010. Highway segments within the project area near existing population centers are expected to continue growing at about the same rate as they have for the last twenty years. Highway segments farther removed from population centers are expected to grow slower, but still at a rate faster than the statewide average.

By the year 2000, traffic levels will remain highest at the north and south ends of the lake, and lowest near the county line at the center of the lake. US 93 will continue to have the higher traffic levels, with daily totals ranging from 3,700 to 15,200 vehicles per day (annual average). MT 35 traffic levels are expected to range from 2,400 to 8,900 vehicles per day, and MT 82 is expected to carry about 5,350 vehicles per day (also annual averages).

By the year 2010, US 93 will still have the higher traffic levels, with daily totals ranging from 5,500 to 24,800 vehicles per day. MT 35 traffic levels are expected to range from 3,500 to 14,500 vehicles per day, and MT 82 is expected to carry about 8,700 vehicles per day.

Existing and Projected Traffic Volumes

Route Segment		Average Vehicles per Day 1991	2000	2010
US 93:	mp54-MT35	7,900	12,400	20,200
	MT35-S354	9,800	15,200	24,800
	S354-Big Arm	2,900	4,700	7,700
	Big Arm-MT 28	2,300	3,800	6,200
	MT28-S352	2,900	4,300	6,400
	S352-Cnty Line	2,300	3,700	5,500
	Cnty Line-Lakeside	2,500	3,700	5,500
	Lakeside-S of Somers	4,700	7,750	12,700
	S of Somers-MT82	5,200	8,400	13,700
MT82:	US93-mp3	3,600	5,350	8,700
	mp3-MT35	3,300	5,350	8,700
MT35:	US93-Turtle Lake	4,900	7,100	11,600
	Turtle Lake-Yellow Bay	2,400	2,800	4,150
	Yellow Bay-Woods Bay	1,700	2,400	3,500
	Woods Bay-S209	2,900	5,100	8,300
	S209-MT82	5,200	8,900	14,500

These projected traffic volumes would require major improvements to several highway segments to maintain adequate levels of service for the travelling public. US 93 would require full four-lane sections from the south through Polson, and from Lakeside north to (and beyond) the MT 82 intersection. Montana 35 would also require a four-lane section from Bigfork north to highway 82. Major improvements to the two-lane roadway would also be required on Montana 35 from Woods Bay to Bigfork, and from East Bay to Polson. Montana 82 would require similar two-lane improvements. Each of the primary highway intersections would require signalization, and additional turning lanes.

VEHICLE CLASSIFICATIONS

MDT's traffic counters also collect classification information based on the number of axles on each vehicle. This method of data collection is often supplemented and corrected by manual visually-based counts. The classification information is often useful for pavement design, safety analysis, and related traffic and economic analyses.

MDT's data indicates that about 10% of traffic on US 93 south of Polson is made up of commercial vehicles (generally larger trucks and buses), with the remaining 90% private or non-commercial vehicles. US 93 north of Polson has 13% commercial and 87% non-commercial trips. Montana 35 has about 18% commercial and 82% non-commercial, and Montana 82 has about 7% commercial and 93% non-commercial trips.

The vehicle classification data shows that buses make up about 0.3% of US 93 traffic, and about 0.5% of MT 35 traffic. Much of the remaining commercial traffic on MT 35 has been observed to be wood chip haulers, which are assumed to be travelling between lumber mills near Columbia Falls and paper processing facilities in Missoula.

RPA conducted visually-based vehicle classification counts at eleven locations around Flathead Lake in May and July of 1993. These observations correlate closely with MDT values for US 93 and MT 82. The RPA data however, shows significantly less commercial traffic on MT 35 than was indicated in the MDT data. This change is possibly due to highway construction activities on MT 35 north of the project area during the study. It may also be attributable to voluntary commercial diversions to US 93 as was reported by some individuals during the course of this study.

The RPA data also identified significantly higher percentages of bus and/or recreational vehicle trips than was indicated in the MDT data. The higher bus/RV traffic share is primarily attributable to seasonal recreation-related effects, but may also reflect minor recent trends toward more of this traffic.

MDT conducted truck off-tracking studies in 1984 and 1990 to determine whether or not trucks had difficulty staying in their lanes as they negotiated curves or corners along each highway. Neither study found any apparent problems of this kind within the project area.

Residents along the east shore corridor have been active and vocal in the past to protest truck traffic along this highway. Their efforts included a major campaign of newspaper editorials and letters to legislators and MDT officials in 1990 and 1991 in an attempt to restrict truck traffic on the east shore highway. These restrictions were never ratified or implemented. Resident concerns about "near misses" and other safety issues related to fast truck traffic that were voiced throughout that campaign were repeated again in public comments for this study. Beyond the safety issues, residents generally view commercial traffic as being incompatible with the preferred residential and recreational uses that already occur along the route. West shore residents voice similar concerns about truck traffic effects on pedestrian safety where US 93 passes through the Polson, Elmo, and Lakeside communities.

TRAVEL ORIGINS and DESTINATIONS

Concurrent with the vehicle classification counts, RPA also conducted a limited origin-destination study of traffic travelling through the Flathead Lake corridor. The study was based on the home county for each vehicle based on observed license plate information. These surveys indicate the amounts, directions, and patterns of travel through the corridor.

As would be expected, Lake and Flathead counties comprised the greatest number of vehicles observed, with 74% of US 93 traffic south of Polson, 47% of US 93 traffic north of Polson, 52% of MT 35 traffic, and 61% of MT 82 traffic. Missoula County was the only other single county to generate a significant portion of traffic, with 9% of US 93 traffic south and north of Polson, 6% of MT 35 traffic, and 4% of MT 82 traffic.

Other in-state vehicles amounted to 7% of US 93 traffic south of Polson, 11% of US 93 traffic north of Polson, 13% of MT 35 traffic, and 12% of MT 82 traffic. Out of state vehicles amounted to 7% of traffic on US 93 south of Polson, 31% on US 93 north of Polson, 26% on MT 35, and 23% of traffic on MT 82. Origins of the remaining traffic was not identifiable because license plates were pro-rated for interstate travel, or unreadable.

The times, directions, and volumes of travel observed indicate that a little commuter travel may be occurring on US 93 and to a lesser extent, on MT 35. The combination of origin / destination data and overall traffic counts also suggests that local traffic is concentrated at either end of the lake, and is less likely to travel the full distance through the corridor than traffic from more distant origins.

TURNING MOVEMENTS

MDT collects turning movement counts at each of the primary highway intersections in this project area, and at the US 93 / MT 28 (secondary) intersection at Elmo. This information often indicates general travel patterns, but is primarily collected to analyze intersection performance and design improvements.

The turning movement data for locations within this project area generally indicate that traffic volumes are greatest between population centers. Traffic volumes are generally highest straight-ahead through intersections, followed by pathways that connect communities, such as Bigfork-Kalispell, Somers-Kalispell, and East Bay-Polson.

RPA conducted intersection turning movement counts at each of the locations where MDT maintains data (junctions of US 93-MT 35, US 93-MT82, and MT 35-MT 82). The RPA counts generally matched MDT's turning movement percentages, but showed higher total traffic counts, resulting in reduced reserve capacity (increased congestion) in each of the intersections. Capacity analyses based on RPA data indicate that each of these intersections create "average traffic delays" or longer for current conditions. At least one turning movement in each of the intersections will suffer "extreme traffic delays" by the year 2010 unless intersection improvements are made.

TRAVEL SPEEDS and TRAVEL TIMES

Travel speeds are directly related to roadway design standards, traffic safety, and user travel costs. As a result, traffic speed data is often collected and compared with accident data and roadway characteristics to evaluate travel conditions on highways. Travel speeds also determine enroute travel time, which in turn affects driver route selection decisions. These factors all contribute to the traffic splits on MT 35 and US 93.

MDT's permanent traffic counter located on US 93 just north of Elmo collects traffic speed data at this one location. Additional spot speed studies were conducted as part of this project at ten other locations in May and July of 1993. The spot speed data was then used for comparison with the MDT data, and analysis of the rest of the project area.

The traffic speed analysis is primarily based on two characteristics, the "10 mph pace" and the "85th percentile speed". The 10 mph pace refers to the contiguous 10 mph range of speeds that contains the largest number of observations, normally including about 70% of the traffic. If the 10 mph pace percentage is significantly lower, then passing frequency tends to increase and accidents become more likely.

The 85th percentile speed is the speed at or below which 85% of the traffic is moving. This speed is most indicative of a safe and reasonable speed limit, based on the assumption that the travelling public is usually able to determine a safe travel speed based on their own driving experience.

MDT's speed data for US 93 just north of Elmo shows the upper level for most traffic ranging from 68-77 mph (based on the 85th percentile speeds). This is significantly higher than both the posted speed limit (55 mph) and the design speed (60 mph - intended to provide a 5 mph factor of safety above the posted speed limit). This suggests that US 93 "feels" like a safe road for faster travel at this location, so drivers are willing to exceed the posted speed limits.

RPA's speed study data for US 93 indicates that travel speeds are fairly consistent at each location (based on the 10 mph pace statistics). Observed speeds indicate an upper speed limit of 60-64 mph (based on 85th percentile statistics), which exceeds both the posted speed limit (55 mph) and the roadway design speed (generally 60 mph). These observations again confirm that much of US 93 "feels" like a safe road for faster travel, especially on segments near the center of the lake.

The speed study data for MT 35 indicates that its travel speeds are also fairly consistent. Observed speeds indicate an upper speed limit of 59-63 mph on open stretches of road, with lower speeds in more developed areas. These speeds exceed both the posted speed limits (50 mph or lower) and the roadway design speeds (55 mph or lower). These observations suggest that MT 35 travellers are willing to accept a higher degree of risk to continue travelling at "normal" highway speeds, even though the roadway conditions do not warrant it.

The speed study data for MT 82 indicates that its travel speeds are consistent, with an upper limit of about 60 mph. These observations suggest that traffic on this roadway is exceeding the posted speed limit (55 mph), and travelling at about the design speed (generally 60 mph).

Travel times were studied through both corridors in May of 1993 to determine how travel speeds and distances combine in total along either route. The study was conducted by driving each route, merged in with normal traffic, to approximate their travel speeds, delays, and overall travel time. This resulted in a travel time of about 51 minutes on US 93 between the MT 35 and MT 82 junctions. The travel time on MT 82 was just short of eight minutes, from the US 93 junction to the MT 35 junction. The travel time on MT 35 from MT 82 to US 93 was about 40 minutes.

PEDESTRIANS and BICYCLISTS

Current federal legislation in the United States requires that state transportation agencies' planning, construction and programs consider all modes of transportation. This mandate requires pedestrian and bicycle travel needs to be addressed by future plans for the east and west shore highways around Flathead Lake.

US 93 along the west shore provides shoulders at least three feet wide along over 95% of its length. Designated bicycle /pedestrian paths are provided through Somers and Lakeside, sidewalks are provided across the Flathead River near Polson and through parts of downtown Polson. Virtually no bicycle or pedestrian facilities are provided along Montana highways 35 and 82 along the lake's east and north shorelines.

Bicycle and pedestrian traffic was observed and in some locations, formally counted in May and July of 1993. These studies found that little or no pedestrian and bicycle traffic passes through the mid-sections of either the east or west shore corridor. This traffic is much more common however, in and near communities along both corridors.

Pedestrian and bicycle activity occurs across and along the highway all the way through Polson, concentrated near the downtown area. Pedestrians and bicyclists also travel along MT 35 from the East Bay area to Polson even though there are virtually no facilities to accommodate them there. Pedestrian and bicycle crossings also occur regularly at Elmo, Dayton, and Somers. Much of this activity is related to school bus service, as children cross or walk along the highways to and from school bus pick-up / drop-off points.

Bigfork and the area surrounding it also has a higher incidence of bicycle and pedestrian traffic, although separate facilities generally are not available. Limited bike and pedestrian traffic also occurs along and across highway 35 at Woods Bay, Yellow Bay, and other rural residential areas scattered along much of its length. This type of activity increases during cherry harvesting season, when roadside stands are commonly used to showcase and sell fruit.

Because of its scenic, natural, and recreational qualities, the Flathead Lake corridor is also used for bicycle tours. The annual "Tour of the Swan River Valley" is held annually in May, attracting an estimated 700 riders per year. This tour enters the east shore corridor at Bigfork on S-209, travels south on MT 35 to Polson, and then continues south on US 93. The annual "Tour of the Flathead" race is held in August, and attracts an additional 40-50 riders per year. This race enters the project area on MT 83, north of Bigfork. It passes all the way around the lake, via MT 35 southbound, US 93 northbound, and MT 82 eastbound.

Another popular bicycling route, shown on widely distributed Bike Centennial maps, passes along the northerly shore of the Flathead Lake across highways S-209, MT 35, and MT 82. This route is used by a variety of groups. It forms part of the route for the "Great Parks North Trip" which is scheduled for several rides each year, and the annual "North Star Trip".

At least two bicycle clubs use different portions of the Flathead Lake corridor highways for regular club activities and/or training. An unknown number of individual riders, including tourists and local riders also use different sections of these highways.

SCHOOL BUS ROUTES

The Flathead Lake east and west shore corridors are covered by six separate school districts that bus students to and from area schools. While actual routes and stops change from year to year, their 1993 service is described here to provide an indication of the amount of activity that occurs.

Kalispell School District No. 5 buses high school students on US 93 as far south as Lakeside. They operate two bus routes on the highway in this area, with ten stops on US 93 each morning and afternoon. Somers School District runs five elementary school bus routes on or across US 93 from just north of the county line to north of MT 82, and on MT 82 along the north-westerly half of Flathead Lake.

The Bigfork School District runs four bus routes on MT 35 from milepost 18 (at the Flathead Indian Reservation boundary) to highway 82, and on the easterly half of MT 82. Bigfork school buses make over 30 stops on highway 35 twice daily.

The Polson School District operates six bus routes on US 93 and MT 35. Their coverage extends from milepost 17.5 on MT 35 (near the northerly boundary of the Flathead Indian Reservation) to milepost 91 on US 93, which is near the Lake County line. Their buses make about 26 stops on MT 35 and about 34 stops on US 93 each morning and afternoon.

Two Eagle River Schools operates one bus route on Mt 35 and US 93 between Pablo, Turtle Bay, and Dayton, for high school students only. The Salish Kootenai College also runs a single route between Pablo and Dayton. Neither route currently makes stops on either of the highways.

ACCIDENTS and WINTER DRIVING

All reported motor vehicle accidents that occurred on US 93, MT 35, and MT 82 within the project area in 1990, 1991, and 1992 were obtained and reviewed as part of this study. The accident data, combined with current traffic volume information, was used to determine accident rates and perform related analyses.

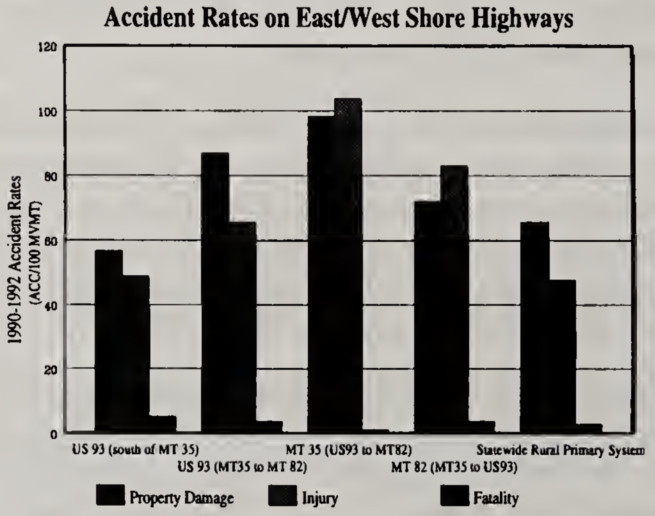
Motor vehicle accidents are normally categorized into "property damage only", "personal injury", and "fatality" accidents. This allows accident analyses to address not only the number of accidents, but also their severity. When compared against the amount of traffic using the roadway, the data is further described in terms of accidents per million (or hundred million)-vehicle-miles-travelled. These rates can then be compared to statewide, system, or regional accident rates to determine a roadway's relative safety.

US 93 had the lowest property damage only (PDO) and personal injury accident rates within the project area during this period. Both of these were lower than the statewide averages. This section of highway also had the highest fatal accident rate and overall accident severity rate within the project area, both of which were significantly higher than the statewide averages.

Accident rates for US 93 between the MT 35 and MT 82 junctions for this period are all higher than the statewide averages, although the fatality rate is lower than for the adjacent section of US 93. The accident severity rate for this section of roadway is essentially equal to the statewide average, and lower than all other roadway segments within the project area.

MT 35 had the highest PDO and personal injury accident rates within the project area, both significantly higher than the statewide averages. Its fatality rate however, was lower than for any of the other highway segments, and lower than the statewide average. MT 35 had an accident severity rate that was just slightly higher than the statewide average, but lower than that for MT 82 and US 93 south of Polson.

Accident rates for MT 82 varied between the extremes for the other highway segments within the project area, but were all still higher than the statewide averages. With relatively high personal injury and fatal accident rates, this segment had the second highest accident severity rate within the project area, significantly higher than the statewide average.


Accident Rates on East/West Shore Highways

Accident rates for individual intersections are also reviewed, in terms of accidents per hundred-million-vehicles-entering the intersection. For this project, the intersection of US 93 and MT 82 just north of Somers had the highest accident rate, followed by the intersection of MT 35 and MT 82 north of Bigfork.

These accident statistics generally indicate that the highways within the Flathead Lake corridor are slightly less safe than many other highways throughout the rest of the state. For this reason, as with many other highway planning projects, actual accident locations were compared with roadway conditions, weather locations, times of occurrence and other factors for each accident to identify problem areas and determine probable causes.

The accident analysis indicates that accident rates in this area are generally highest in winter months. The total number of accidents also rises in July and August because of increased traffic at these times, but the summertime accident rates remain lower than the wintertime rates. The following factors were identified as significant contributors to the accident history on these highways.

- From 14% to 24% of the total accidents on these highway segments occurred during raining or snowing weather conditions. About 9-17% of accidents on these highways occurred on wet or slushy roads. An additional 18-24% occurred on snowy or icy roads.
- From 33% to about 48% of accidents on each of the project area highway segments occurred in low-light conditions (nighttime, dusk, or dawn). 68-90% of these accidents involved only one vehicle.
- From about 8% to 24% of all accidents involved collisions or near collisions with animals. Roughly one-half of the animal related accidents also occurred in low-light conditions.
- 17% of accidents on MT 82, and 31% of accidents on MT 35 and US 93 occurred at or because of roadway intersections.

These accident statistics indicate that weather conditions, roadway surface conditions, light conditions, animal crossings, and roadway intersections were all significant contributors to the accident history on these highways. Recommendations for corridor management and highway improvement projects (discussed later) were then developed to address these needs.

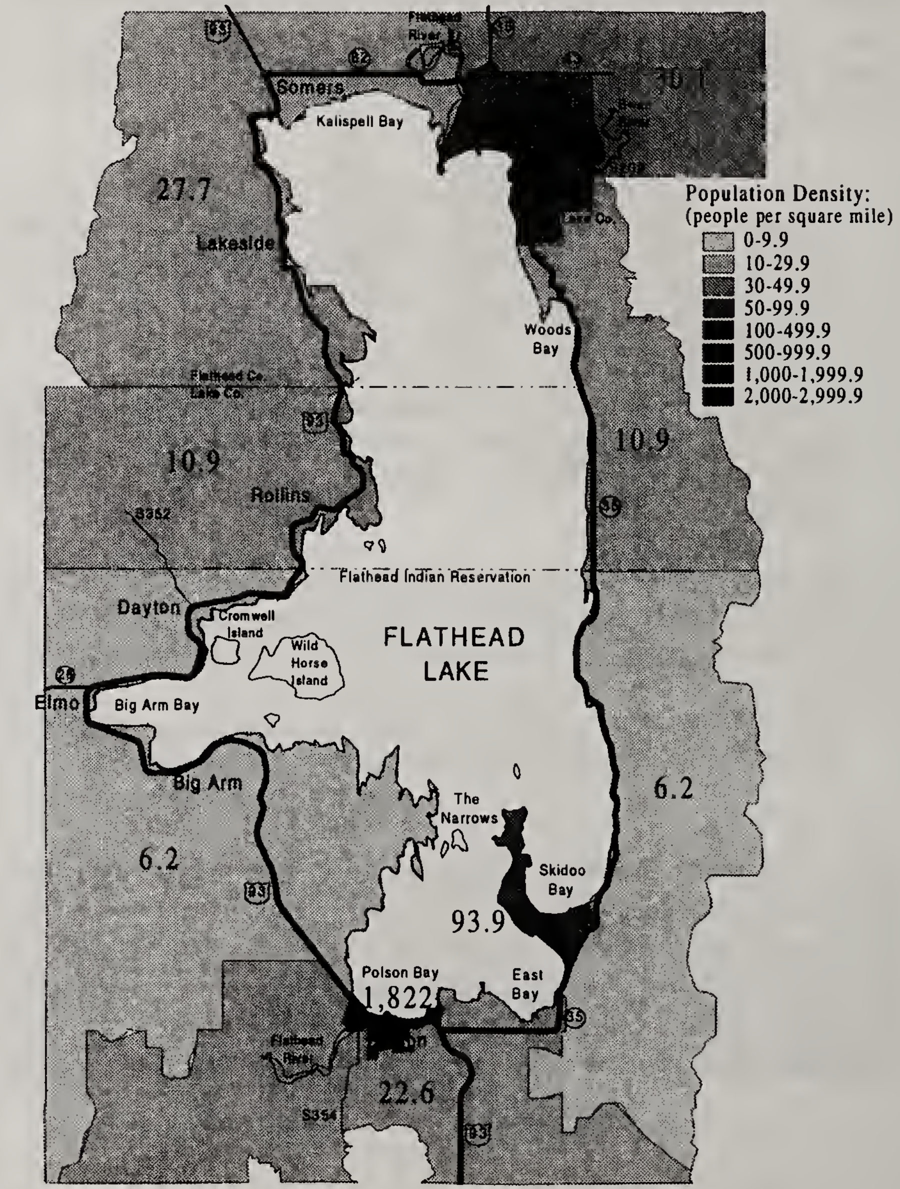
POPULATION & DEMOGRAPHICS

Population and demographics information was collected for the area surrounding Flathead Lake for this study, to supplement the traffic data and support conclusions about possible future growth. This information was obtained from a variety of sources, including the United States Census and Economic Information Center, the Montana Department of Commerce, the Flathead Convention and Visitors Association, various Flathead and Lake County agencies, and other local organizations.

Polson and Bigfork are the largest communities in the project area, and Kalispell is close enough to affect travel behavior throughout the area. These communities, along with Lake County and Flathead County were used as the major geographic groupings for this analysis, since this is the level of data generally available from US Census reports and other sources. Statistics collected and evaluated to establish population and demographic conditions include the following.

- ✓ Total Population
- ✓ American Indian Population
- ✓ School Enrollments
- ✓ Housing Units
- ✓ Telephone Access Lines
- ✓ Registered Vehicles
- ✓ Workers/Drivers over 16 Years of Age

Population density within the project area is greatest at Polson (not including Kalispell), followed by the area in and around Bigfork. Rural populations are also somewhat denser in and around the other communities of Somers, Lakeside, Rollins, Dayton, Elmo, Big Arm, and Woods Bay; and at Finley Point. Rural densities are also higher within relatively narrow strips of land along each side of the highways in some other areas.



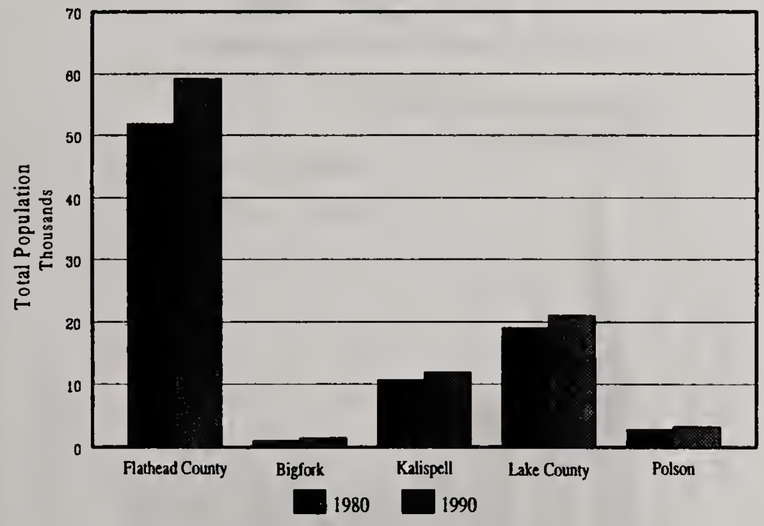
Population Density:
(people per square mile)

▨	0-9.9
▨	10-29.9
▨	30-49.9
■	50-99.9
■	100-499.9
■	500-999.9
■	1,000-1,999.9
■	2,000-2,999.9

Flathead County had the largest population of these geographic areas in 1990 with 59,218 residents. This total included 858 American Indians. Lake County had 21,041 residents, including 4,479 American Indians. Kalispell was the largest of the communities in the area, with 11,917 residents; followed by Polson, with 3,291 residents; and Bigfork, with 1,461 residents.

Each of these populations has grown significantly since the 1980 census. Bigfork grew by 35%, Polson by 18%, Kalispell by 11%, Flathead County by 14%, and Lake County by 10%. American Indian populations in Flathead County and Lake County grew by 58% and 42% respectively, while they grew by 117% in Kalispell, and by 143% in Polson.

Population Growth 1980-1990



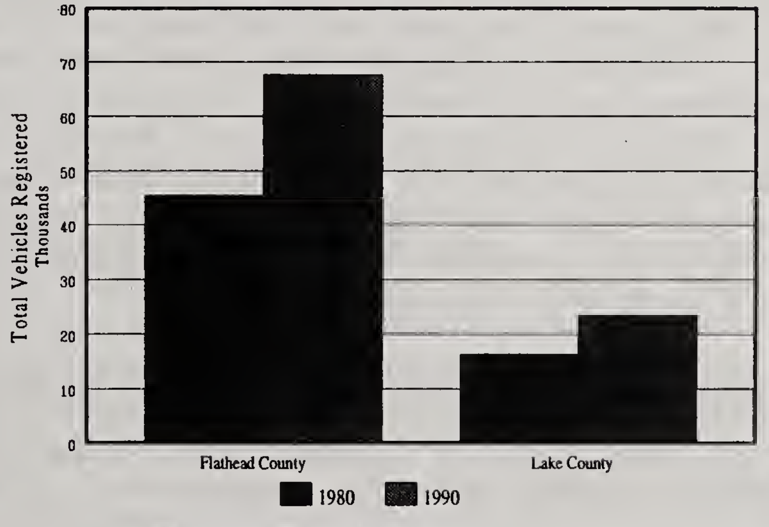
SOURCE: US Census, Census & Economic Information Center - MT Dept. of Commerce (CEIC)

Elementary school enrollments have increased similarly, by about 16% in Polson and 20% in Bigfork. High school enrollment however, decreased by 3% in Polson and 6% in Bigfork over this same ten year period.

The total number of housing units has increased by 20-21% in both counties, while increasing by 16% in Kalispell and 17% in Polson (this information was not available for Bigfork since it is unincorporated).

The number of registered vehicles in Flathead County and Lake County have increased more than three times as fast as the population. Flathead County registered vehicles grew by 49% from 1980 to 1990, and Lake County registrations grew by 44%. Similarly, the number of workers driving to and from work in the region has also grown faster than the population. Driving workers increased by 37% in Flathead County, 38% in Lake County, 34% in Kalispell, and 54% in Polson. These statistics not only confirm the population growth, but also illustrate the increasing demand for auto travel in the area.

Registered Vehicles 1980-1990



Source: Motor Vehicle Division - MT Dept. of Justice, CEIC

ECONOMIC ACTIVITY

Economic activity in the Flathead Lake area was also assessed to supplement traffic data and support conclusions about the valley's future. The key economic indicators obtained and reviewed in this study included the following.

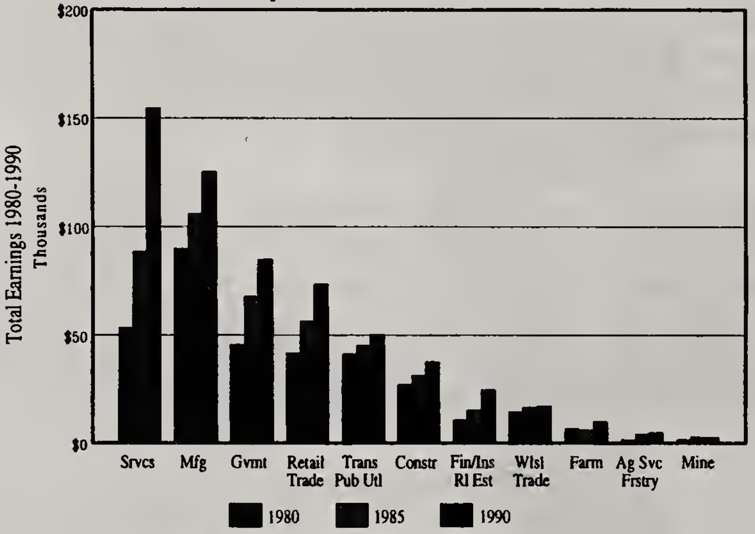
- ✓ Total Business Establishments
- ✓ Business Telephone Access Lines
- ✓ Total Employment
- ✓ Employment by Industry
- ✓ Total Earnings of Individuals by Industry

All of these economic indicators show some component of growth equalling or exceeding population growth in the area. The number of business establishments has increased by 53% in Flathead County and by 41% in Lake County. Business telephone access lines also grew, although not as quickly.

The total number of jobs grew by 29% in Flathead County and 34% in Lake County. The bulk of growth in Flathead County occurred in service industries and retail trade (which include most businesses traditionally associated with tourism). Government, finance, insurance, and real estate employment also increased over this ten year period in Flathead County. Manufacturing employment did not grow, and construction employment grew only slightly. Individual earnings in Flathead County increased in all categories, including those where the number of jobs did not increase.

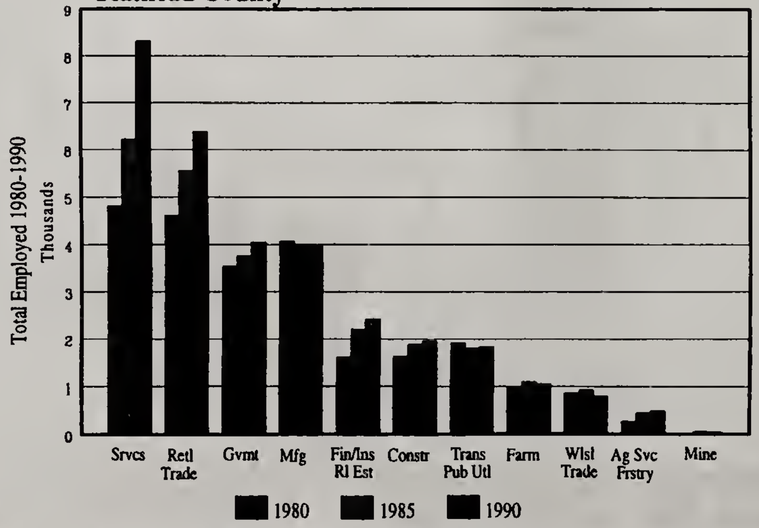
Employment growth in Lake County was also led by service and retail trade industries and government. Unlike Flathead County, farming plays a significant role in Lake County's employment, as its fourth largest employer.

Individual Earnings by Industry
Flathead County



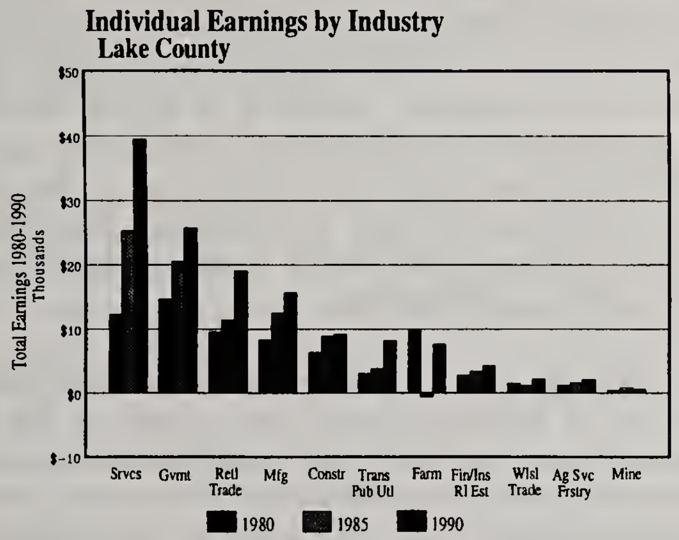
Source: US Dept. of Commerce - Bureau of Economic Analysis, CEIC

Employment by Industry
Flathead County

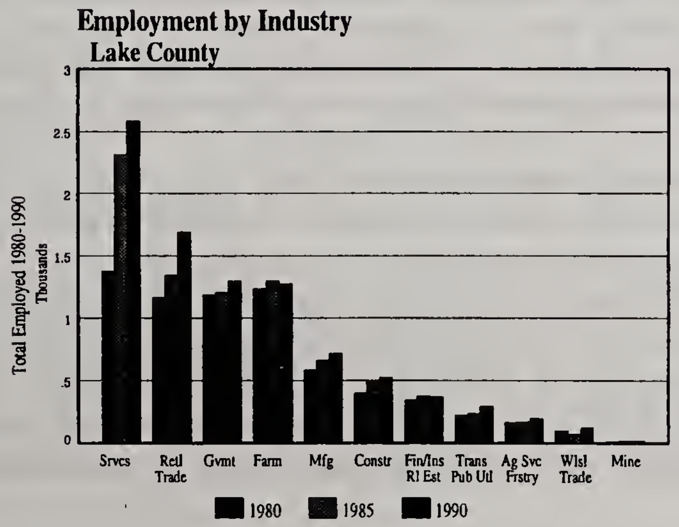


Source: US Dept. of Commerce - Bureau of Economic Analysis, CEIC

Individual earnings increased for all industries in Lake County except farming, a trend generally similar to the growth in Flathead County.



Source: US Dept. of Commerce - Bureau of Economic Analysis, CEIC



Source: US Dept. of Commerce - Bureau of Economic Analysis, CEIC

TOURISM

In addition to employment and earnings, the following economic indicators were also studied to assess tourism in the Flathead Valley. These statistics are all based on services that directly serve tourism.

- ✓ Hotel/Lodging Employee Earnings
- ✓ Quarterly Bed Tax Collections
- ✓ Hotel, Motel, Condominium, and Bed & Breakfast Rooms
- ✓ Campgrounds

Employee earnings from hotel and other lodging facilities increased by 43% from 1980 to 1990 in Flathead County. The same employment category increased by only 7%. In both cases, this employment category decreased from 1980 to 1985, and then rebounded to 1990.

The State of Montana began collecting hotel/motel bed taxes in 1988. Since then Kalispell bed tax revenues have grown at an average rate of about 11% per year, to a total of $382,050 in 1992. Bed tax revenues in Lake County have grown at about 12% per year over this same time period, to a 1992 total of $73,410.

The Flathead Convention and Visitors Association recently began the practice of tracking overnight visitor accommodations in the Flathead Valley. This information provides another perspective on the region's ability to accommodate tourists. Their statistics currently show that Kalispell offers 1,209 hotel, motel, condominium, and bed & breakfast rooms. Bigfork offers 311 rooms, Polson offers 272 rooms, and Lakeside offers 57 rooms. In addition to these overnight accommodations, there are eight public and twelve private campgrounds that serve the Flathead Lake area.

FUTURE CONDITIONS

All of the demographic and economic information reviewed for this study indicates that the Flathead Valley has experienced significant population and economic growth since 1980. By every measure there are more people, more vehicles, more children in school, more people working, more economic activity, and more tourists and tourist accommodations than there were ten years ago.

The University of Montana's Bureau of Business and Economic Research has characterized Flathead County as "currently the fastest growing of Montana's major urban areas" (*Winter Outlook*, 1990). In their 1992 *Winter Outlook*, the Bureau noted that "Flathead County was one of the fastest growing areas in Montana during the 1980's, but growth rates [have] decelerated since mid-decade. Wood products and metal refining are the two largest basic industries. Both were responsible for cyclic declines [in the economy] in the mid-1970's and early 1980's, and along with non-resident travel, were the factors behind the 1980's rapid growth." Both publications point to Kalispell's emergence as a regional trade center and the impact that such status has on the area's economy as the city becomes a magnet for area-wide consumers of retail goods, health care, and services. Trade center status also indicates greater use of local highways as area residents travel to Kalispell to fill greater percentages of their consumer needs.

The tourism industry is a major and growing segment of the economy for the Flathead region and the corridor. According to the Institute for Travel and Tourism at the University of Montana, statewide non-resident travellers spent $751 million in Montana in 1990 resulting in a total economic impact of $1.67 billion and the creation of 26,700 jobs. The 1990 estimates also show that about 2.26 million "traveller groups" visited the state in that year with over two million of those traveller groups utilizing highways as their means of reaching Montana. The area known as "Glacier Country" (the multi-county area constituted by northwest Montana) is by far the statewide leader in tourism impact, with 31 percent of non-resident expenditures made in this area compared to the runner-up "Yellowstone Country" (the area surrounding Yellowstone Park) at 21 percent. The direct tourism-related payroll for Glacier Country is $55 million.

Tourism and the in-migration of people to the Flathead area because of the physical beauty and quality of life that also attract tourists, are having a very significant impact on the mix of businesses and on the self-image of the area. In 1987, the Associated Chambers of Commerce of the Flathead Valley helped establish the Flathead Convention and Visitors Associated and commissioned the development of a business plan calling for a 10 percent annual expansion in tourist revenue to the area. Indicators suggest that this goal is being met and that the importance of tourism will continue to grow.

In conclusion, the east shore/west shore corridor serves an area that is experiencing significant growth. That growth is in large part dependent on the area's highway system. People use US 93 and MT 35 as the routes over which their daily lives are conducted; industries use the highways as arterials for the transportation of goods; and tourists - and people looking to re-settle in the area - get their first impressions of the area and access their destinations through use of these highways.

HIGHWAY ACCESS

Access is a very important component of any highway facility. Adjacent landowners depend on their rights to move to and from their property using the highway. At the same time, accidents are frequently caused by improperly located access points or having too many closely-spaced accesses.

For this reason, the Montana Department of Transportation seeks to limit highway access whenever possible. In their April 1992 *Access Management Plan,* MDT defined their policy for future highway construction projects. The plan specifies that access rights will be secured where major improvements are undertaken on designated rural primary routes. This policy applies to both the east and west shore routes along the Flathead Lake.

According to MDT's "Access Control Information", there are four projects for which the MDT has acquired access control rights on the east/west shore corridor highways. Together, these projects control access to about 18.8 out of the 91 highway miles within the project area. All of the access control is on US 93.

Existing accesses and mailbox installations on the highways within the study area were inventoried for this project in May of 1993. The accesses were categorized as road and street, private driveways, pullouts, and farm type access; since the different types of access often impact traffic conditions in different ways.

In general, the road and street accesses usually have traffic control, advance warning signs, and adequate sight distance. Driveway accesses are usually uncontrolled and tend to occur at random along the corridor. Driveways often are not marked, and sight distance is sometimes a problem. Residential and commercial driveway accesses often generate considerably more activity than farm accesses or pullouts.

The inventory shows that MT 82 and US 93 (excluding Polson) average between nine and 11 accesses per mile. Driveways represent between 57% and 62% of the total accesses in these portions of the study corridor. In many cases there are single accesses that serve several homes or an entire subdivision.

Access on MT 35 is considerably different. MT 35 has over 19 accesses per mile; 88% are private driveways. This reflects a greater number of residential properties with direct access to the highway along the east shore of the lake. This is supported by the relatively large number of mailboxes per mile (9.44) along this route. A one mile section of MT 35, between mileposts 18 and 19, has 52 accesses.

The City of Polson has a total of 113 accesses along MT 93 (from the junction of US 93/MT 35 to the west end of the Flathead River bridge). This section averages 52 accesses per mile, reflecting the urban nature and commercial activities that line MT 93 through the City. Moreover, 44 of the accesses in Polson are graveled, and eight of these are between 100 and 300 feet long, resulting in a virtually uncontrolled access situation. Accident data indicates that these long, uncontrolled access points are a safety problem.

In May 1993, MDT submitted a report entitled "Preservation of Right-of-Way for Transportation Corridors" to FHWA in response to ISTEA Section 1017(C). This report identifies MDT's priorities for consideration and placement on a national list of corridors for preservation of right-of-way. The entire east and west shore corridors (except US 93 through Polson) are included in this report. Access control through Polson is addressed separately to deal with a proposed by-pass route for this segment.

RIGHT-of-WAY ENCROACHMENTS

The MDT District Engineer's office in Missoula completed an inventory of right of way encroachments along MT Highway 35 in July 1992. This survey identified 44 signs, 15 vehicles, and 31 buildings or other fixtures encroaching on the MT 35 right of way between its US 93 and MT 82 junctions. Fourteen of the sign and 15 of the building encroachments were related to summertime cherry sales. A supplemental field survey by RPA in 1993 indicated that one additional cherry stand is now encroaching on the MT 35 right-of-way.

RPA also surveyed US 93 and MT 82 for right-of-way encroachments within the project area in 1993. No encroachments were found.

LAND USE PLANNING

Current land use patterns around Flathead Lake were obtained from Polson and Kalispell BLM surface management status maps (1982 and 1983 editions) and a Flathead Indian Reservation ownership map (February 1992) supplied by the Confederated Salish & Kootenai Tribes.

These resources indicate that the majority of land surrounding the lake and adjacent to the highway corridors is privately owned. The Flathead Indian Reservation, with significant areas of Indian Lands, encompasses the southern half of the lake. National Forest and Wildlife Refuge areas also cover a large portion of the land to the east and west of Flathead Lake.

Some of the land surrounding the Flathead Lake is controlled by land use plans. The Lake County General Plan (July 1, 1988) identifies 13 planning units covering the entire county. The East Shore, Finley Point, Wildhorse, Big Arm-Elmo and West Shore planning units lie within the project area. Planning guidelines for the North Lake County Area address lakeshore development, agriculture, highways, rural tract development, water quality, wildlife and community growth.

An important agricultural land use consideration is the preservation of the orchard-based community character in the Yellow Bay area. Highway land use considerations identified in the Lake County General Plan express a concern over the safety of both the east and west shore highways, based on traffic volume, road width, road condition and number of approaches. They also express a desire to control the location, type and design of commercial and industrial development along these highways.

Lake County land division information from 1973-1992 was provided by the county land services office. This data shows that 14,195 acres county-wide have been subdivided into 3,130 parcels less than 20 acres in size over the past 20 years. During the same time period, another 12,802 acres were subdivided into 589 20-40 acre parcels. It is estimated that 8,200 of the acres subdivided into parcels smaller than 20 acres, and 6,900 acres of 20-40 acre parcel subdivisions occurred in the North Lake County Planning Area. This represents a substantial amount of land division activity in the east shore/west shore area.

The Flathead County Master Plan 2000 (March 10, 1987) addresses land use and transportation on a county-wide basis as well as identifying specific goals for smaller planning units within the county. The planning unit community plans affecting the east and west shore corridor area are East Shore, West Shore, and Lower Valley. Relevant land use topics are rural communities (including Lakeside, Somers and Bigfork), water and waterfront development (including Flathead Lake), and more generally, residential and commercial/industrial development.

The Flathead County Plan identifies the desire for rural areas along the east and west shore highways to be mainly agriculture and forestry, followed by rural residential use (one unit per acre) in the areas surrounding Bigfork, Somers and Lakeside, and small suburban residential development (two units per acre) areas adjacent to Bigfork and Lakeside. A small amount of urban residential development (two to eight units per acre) is planned for the Bigfork community. The overall intent is for commercial /industrial development to be limited to the established communities of Somers, Lakeside and Bigfork.

The Bigfork Area Land Use Plan (March, 1992) is proposed as an addition to the Flathead County Master Plan 2000 which predates it. The planning area identified as the Bigfork Area is part of the County Master Plan's East Shore Planning Unit. Bigfork residents have developed policies to keep commercial development in areas where it currently exists, prevent strip development along highways, and limit industrial development to designated areas.

A Polson City Master Plan is being developed cooperatively by the City of Polson and Lake County, and should be finalized and adopted sometime in late 1993 or early 1994. This document establishes general policy guidelines for accommodating anticipated growth within a Polson city-county planning area.

LAND USE ZONING

The Bigfork Area Land Use Plan is currently the only zoning ordinance in effect within the study area in Flathead County. It identifies the following proposed new land use classifications: Residential Natural Areas of 5 acres or more, Village Resort Commercial, Rural Mountain Land, Visitor Recreation Area, and Country Corner Commercial.

Although zoning ordinances do not yet exist elsewhere within the project area in Flathead County, the County Commissioners have adopted a policy to move toward county-wide zoning. Toward this end, the "Cooperative Planning Coalition: Flathead 2020" has been formed with participation from public and private groups.

Two sets of county zoning ordinances and City of Polson zoning ordinances currently apply to the study area within the jurisdiction of Lake County. They are identified as the East Shore Zoning District and the Finley Point Zoning district. These regulations apply to all lands within the respective districts except land owned by the Federal Government, and land owned by the Confederated Salish and Kootenai Tribes within the Flathead Reservation.

The East Shore Zoning District and Regulations were adopted by the Board of Commissioners effective September 1, 1991. They define permitted uses for new development to include single family residential, agricultural, and forestry operations. Conditional uses which require public review of the County Planning Board and approval by the Board of Commissioners are bed and breakfast, home occupations, expansion of existing business, guest houses, single wide mobile home, retreat centers and church camps, duplexes, industrial use for fruit processing, business signs, and structures over 30 feet in height. Prohibited uses are residential multi-family, industrial, recreational vehicle campgrounds, mobile home parks, and commercial.

The maximum density of new land development is one dwelling unit per 2.5 acres. Setbacks, buildings, signs, common lake access, land divisions, building notification permit, agricultural exemptions, storm drainage, existing uses, variance, violation, amendment, and definitions are also addressed in these regulations.

The Finley Point Zoning District and Regulations were adopted by the Board of Commissioners effective January 7, 1992. This district is divided into six sub-units for purposes of permitted, conditional and prohibited uses, and density of future development. The sub-units are Highway Lakeside, Highway

Mountainside, Skidoo Lane, Finley Point Lakeshore, Finley Point Interior, and Finley Point Highway.

Setbacks, buildings, signs, common lake access, land divisions, building notification permit, agricultural exemptions, storm drainage, wetlands, existing uses, variance, violation, amendment, and definitions are addressed for the district as a whole.

The Lake County Planning Board hopes to incorporate the rest of the area around Flathead Lake into zoning districts in the next year or two.

Current zoning regulations for the City of Polson were adopted by the city council January 6, 1969. These define minimum regulations for new development applying to specified types of districts within city jurisdiction. Zoning districts are: R-1 and R-2 residence, C-1 central business, C-2 commercial, T-1 tourist service, T-2 tourist service and highway commercial, T-3 and T-3.1 tourist service (west shore), I-1 and I-2 industrial, and A-1 airport zone. Regulations for tourist service (west shore) districts specify an intent to avoid strip development and problems with traffic safety and congestion on the highway. Individual access approaches onto Highway 93 are discouraged, and combining approaches is encouraged for these districts.

In addition, the City of Polson and Lake County are in the process of developing a Polson Development Code which is in draft form as of July 1993. This document will implement the regulatory strategies of the Polson Master Plan (also in draft stages), replacing current zoning regulations for the City of Polson. Under this Code, zoning districts and overlay districts would be established within the jurisdiction of a Polson city-county zoning area. Zoning districts are productive lands, rural residential, low density residential, medium density residential, transitional, resort, highway commercial, central business, and general commercial-industrial. Overlay districts are airport safety, wellhead protection, resort residential, Salish Point, and railyard.

A Consolidated Land Ordinance of the Confederated Salish and Kootenai Tribes was adopted by the Tribal Council January 5, 1973. This Ordinance applies to all Tribal-owned land within the Flathead Indian Reservation. It "provides the vehicle for formalizing and documenting acquisition, disposals, exchanges, leases, permits or other uses" of these lands. The Ordinance references the adoption of a Confederated Salish and Kootenai Tribes Land Use Plan to establish guidelines for Reservation land use and development. This land use plan is not currently available from the Tribes, but will become a part of the Ordinance upon adoption by the Tribal Council.

The Confederated Salish and Kootenai Tribes' regulations also protect Flathead Lake and Flathead River (64A Protection Regulations) and rivers-streams and aquatic lands (87A Protection Regulations). They also include fishing, hunting and recreation regulations; and ordinances on water quality management, and hunting and fishing conservation.

ENVIRONMENTAL

Environmental resources are necessarily related to highway corridor planning, as they sometimes limit or dictate the scope of transportation facilities, and are often impacted by the construction or continuing use of these facilities. For this study, water quality, air quality, solid waste sites, hazardous material sites, and hazardous materials transport were studied.

Water quality information for the Flathead Lake area is summarized in biennial reports by the Flathead Basin Commission. The 1989-90 and 1991-92 reports both state that Flathead Lake ranks in the top ten percent for water quality among lakes of its size in temperate regions of the world. Ongoing water quality monitoring research finds that Flathead River Basin waters remain very clean and highly suitable for such various purposes as domestic use, irrigation, recreation, and maintenance of trout fisheries. However, the 1991-92 report states that the rapid increase in human population in the area has had a negative effect on the basin's waters.

Streams in the Flathead River Basin are comparatively higher in terms of water quality than those in the rest of the state. Over 92% of the stream miles in the Basin fully support their beneficial uses, and more than 99% are fishable and swimmable. The largest sources of stream pollution have been identified as forest practices, natural sources, and agriculture; while the leading causes are siltation, suspended solids and nutrients.

Almost 86% of the lakes in the Flathead River Basin fully support their beneficial uses. Flathead Lake is classified as fully supporting, but threatened by one or more pollution sources. The largest sources of lake pollution are forest practices and hydropower production. Leading causes are siltation, suspended solids, and lake level alteration. Flathead Lake is listed as threatened for the uses of cold water fishery and recreation. All Flathead River Basin lakes are fishable and swimmable.

The only recognized problem with air quality within the Flathead Lake study area is in Polson. Polson was designated as a non-attainment area for PM_{10} (fine dust - primarily due to road dust emissions in this case) by EPA on August 7, 1987. Since Polson is in the Flathead Indian Reservation, responsibility for developing a plan to meet acceptable air quality standards falls within the jurisdiction of the Confederated Salish and Kootenai Tribes. Strategies were defined in early 1993, to be used in the CSKT's development of a Tribal Implementation Plan (TIP) for meeting the air quality standards. Some control strategies that have already been considered and may be included in the TIP include the following.

- ✓ Use less sand in winter
- ✓ Use clean sand
- ✓ Sweep streets regularly

Several solid waste facilities are located within the project area. Lake County has two active landfills - a garbage container site southwest of Polson, west of FAS 354; and a third class site (accepts inert materials only) located south of Polson, about 1/2 mile west of US 93. Lake County has one inactive landfill site on US 93 about one mile south of North Reservoir Road. Lake County also has three container sites around Flathead Lake; on MT 35 at Woods Bay Market; on MT 28 about two miles west of Elmo; and on FAS 352 about three miles northwest of Dayton.

Flathead County has only one active landfill, located north of Kalispell on US 93. They have three container sites around Flathead Lake; one on US 93 at Lakeside; one on MT 82 about three miles east of Somers; and one on MT 83 north of Bigfork.

The Montana Department of Health and Environmental Sciences (MDHES) Solid and Hazardous Waste Bureau also tracks underground storage tanks through their Underground Storage Tank Program. As of May 1993, their inventory included the following sites within the project area.

- Eight facilities in Big Arm - one leaking
- 66 facilities in Bigfork - five leaking
- Three facilities in Dayton - none leaking
- Three facilities in Elmo - none leaking
- 27 facilities in Lakeside - two leaking
- 225 facilities in Polson - 21 leaking
- Ten facilities in Rollins - none leaking
- Ten facilities in Somers - one leaking

The Flathead Lake project area does not contain any hazardous waste sites included on the National Priorities List (NPL) for Superfund Sites. However, MDHES has identified two non-NPL Superfund Sites in the study area. One, the Burlington Northern Somers, is the former site of a railroad tie-treating plant. This site is currently under action to clean up soil and water contamination based on EPA's selected remedies. The other non-NPL Superfund Site is the Somers Marina.

Hazardous materials transporters generally carry materials such as gasoline, diesel fuel, batteries, oxygen, glue, resin, salt, fertilizers, medical waste, and other industrial products. Based on reports from known hazardous material transporters based in Montana, a total of about 120-130 hazardous material transport trips are made through the Flathead Lake corridor per week. Of these weekly trips, about 25 only travel south of Polson on US 93. An additional 60 trips use US 93 all or most of the way through the Flathead Lake corridor. About 43 trips are made on MT 35, with about five that travel only as far south as Bigfork.

Hazardous material spills have been recorded near Yellow Bay and at the MT 35 / MT 82 intersection on the east shore. They have also been recorded at eight locations in Lake County along the west shore corridor.

BIOLOGICAL

The Flathead Lake study area contains a variety of biological resources of importance. These include important farmlands, plant species and animal species that are either important for agriculture, unique to this geographic area, or threatened or endangered with extinction.

Much of the corridor between Somers and Big Fork passes through lands that are designated as important farmland by the US Soil Conservation Service. Similar information for Lake County was not available for this study.

The study area includes at least sixteen different landtypes based on the plant communities present. The west shore is dominated by native range and dry coniferous forest types. The east shore is dominated by moist coniferous forest or riparian communities. Pasture and farmland occur primarily on the west and north shores, and orchards primarily on the east shore.

The US Fish & Wildlife Service (USFWS) has federal authority through the Endangered Species Act to list plants as threatened, endangered, or as candidates for threatened or endangered status. Currently, there are no plant species in Montana that are listed as threatened or endangered, although 19 are candidates for listing. The Montana Natural Heritage Program (MNHP), which serves as a clearinghouse for information on rare species and habitats, has designated 383 plant species of special concern in Montana.

Of MNHP's designated 383 species, 35 are known to exist in the Flathead Valley or surrounding area. Of these, eight are known to occur within the study area, and an additional six occur within five miles of the project area.

Additionally, many plant species are important to the Confederated Salish and Kootenai Tribes. For purposes of protection however, these cannot be disclosed. Actions or analyses dealing or potentially dealing with these species within CSKT jurisdictional areas must therefore be coordinated with the CSKT Cultural Committee.

Wetlands exist at numerous locations throughout the Flathead Lake corridor and the surrounding area. The primary occurrences are at the southeast end of the Lake between Polson and Finley Point; just northwest of Polson; at the north end of the lake between Somers and Bigfork; and near Dayton. Narrow areas also occur on the east shore along the perennial streams and in the highway ditches.

Wetlands resources in the greater Flathead Lake area are significant. These include the Ninepipe National Wildlife Refuge and other pothole lake areas on the Flathead Indian Reservation; pothole areas between Woods Bay and Bigfork; the extensive lake and pothole system between Bigfork and Columbia Falls; and the areas associated with the Flathead River north of the lake to Kalispell and Columbia Falls.

The MDT frequently constructs projects that impact wetlands, requiring mitigation, either on-site or off-site. Based on field inventories conducted for this study, it is clear that many locations within the project area will require further study to determine the exact extent and importance of wetlands if they may be disturbed by future construction activities.

Wildlife species in the vicinity of Flathead Lake are as varied as the habitats found there. Because wildlife species usually do not recognize boundaries, the home ranges and territories established by these animals may include areas much greater than a narrow strip of land along the highway.

There are approximately 300 vertebrate wildlife species occurring in this portion of western Montana. Nine big game species, 58 other mammal species, over 250 bird species, nine amphibian species, and nine reptile species are known to occur in this area. White tail and mule deer are the two big game species most commonly seen on the highway corridors. These species are frequently involved in traffic accidents and incidents on these highways.

Sensitive species on the Flathead National Forest include the boreal owl, lynx, common loon, harlequin duck, fisher, flammulated owl, black-backed woodpecker, and Townsend's big-eared bat.

The Montana Department of Fish Wildlife and Parks lists 22 bird species of concern in the vicinity of Flathead Lake. These include (among others) osprey, bald eagles, and several species of hawks and owls. Other species of concern listed by MDFWP include the pygmy shrew, California bat, big-eared bat, grizzly bear, fisher wolverine wolf, lynx, hoary marmot, northern bog lemming, caribou, Coer d'Alene salamander, tailed frog, and wood frog. Although many species are listed for the large areas encompassing Flathead Lake, the habitats used by individual species may not occur in within the actual study limits.

Federally listed endangered species found in the vicinity of Flathead Lake include the Northern Rocky Mountain Gray Wolf, peregrine falcon, and bald eagle. Grizzly bears are listed as threatened.

There are no records of peregrine falcons nesting in the vicinity of the project area, but they are known in the area as spring and fall migrants. There are at least eleven bald eagle pairs nesting on or near Flathead Lake. Several of these pairs nest and hunt close enough to the corridor to require further study should construction activities or new programs be planned pursuant to this study. Wolf sightings are expanding, and there are occasionally isolated sightings reported in the Mission and Salish Mountains. Grizzly bears are frequently observed east of the project area in the Bob Marshall Wilderness, and are occasionally sighted at the north end of the Mission Mountains.

Bull trout and westslope cutthroat trout are listed as species of special concern by the MDFWP, the USDA Forest Service, and the Montana Chapter of the American Fisheries Society. These two trout species, native to the Flathead Basin, are very sensitive to increased levels of fine sediment on stream bottoms. Kokanee salmon and rainbow trout, two other important fish in the Flathead Basin are also quite sensitive to these fine sediment impacts. Bull trout are currently being reviewed for listing as an endangered species by the USDI Fish and Wildlife Service.

The Flathead River, the lower one mile of the Swan River, and a few of Flathead Lake's other, smaller tributaries are utilized by lake fish for spawning. The lake's tributaries along the east shore from Bigfork to Yellow Bay are either too steep or small to support spawning runs. From Yellow Bay to Polson, most of the tributaries have similarly steep gradients, or are ephemeral. Streams entering Flathead Lake from the south shore are either too steep or contain inadequate flow to support spawning for lake fish. Along the west shore, Stoner and Dayton Creeks are known to have supported historic spawning runs of westslope cutthroat. Kokanee also once spawned in Big Lodge Creek downstream of the Highway 93 crossing.

CULTURAL & HISTORIC

Numerous cultural resource studies have been conducted in the area around Flathead Lake. The region is rich in archaeological and historical sites. Increasing development of the area in the last few decades has resulted in a growing body of cultural resource literature. Montana's State Historic Preservation Office (SHPO) files currently list 135 prehistoric sites in the area. The Cultural Resource Annotated Bibliography System (CRABS) files also list 56 cultural resource studies conducted within the region, four of which are directly applicable to this study area.

Prehistoric man has occupied the Flathead Lake area for the last 12,000 years, although most of the known sites date to within the last 5,000 years. Paleoindian projectile points used from 12,000 to 7,000 years ago have been found at a number of locations in northwest Montana. From 7,000 to 5,000 years ago the climate changed to become similar to the present climate, and human groups adapted to these changes. The basic pattern of human land use was relatively well established in the intermountain area by 5,000 years ago. Only a few prehistoric sites have been recorded on the east side of Flathead Lake, but the west side contains numerous sites.

Prehistoric site potential for artifacts is high in the bays and on the lower flat lands along the lakeshore. Because of the dam the water levels have been raised and some of the lakeshore sites have been adversely impacted or partially submerged. Within the highway corridor around the lake, the most sensitive areas are in the flat areas near the lakeshore. Some of the higher flat benches may also have occupation sites. Rock art sites are known to exist outside the highway corridor. Other types of sites including prehistoric and/or historic burial sites have been reported and excavated within the corridor in the past.

Historically, the area was long occupied by Salish speaking tribes; primarily the Pend d'Oreille, Kalispell, and Flathead. The Salish claimed hunting rights and territory along the foothills of the eastern slope of the Rockies. Some moved to the headwaters of the Columbia and Clearwater rivers to fish for salmon, while others wintered in the intermountain Valleys throughout western Montana. The Kootenai bands primarily used lands around Eureka, but also along the Whitefish River and the lakes from Flathead Lake north. Historically, descendants of the Bitterroot Salish or "Flathead", the Lower Pend d'Oreille and the Kootenai have occupied the Flathead Lake area.

The first written mention of Flathead Lake was in a letter written by Peter Fidler, an employee of the Hudson's Bay Company, on July 10, 1802. Non-native incursions into the area were primarily related to the fur trade through the 1830's. The second Euroamerican influence in the Flathead Lake area began in 1845 with the arrival of Father Pierre Jean DeSmet. Several unsuccessful Catholic missions were established before the first permanent mission was established at St. Ignatius in 1854.

Gold strikes in the 1850's and 1860's brought a flood of prospectors into mountainous regions of western Montana. While no gold was found in the Flathead Lake area, a small placer strike occurred in 1864 in the Kootenai region across the international border at Wild Horse Creek near Canada's Fort Steele. This proved important to the Flathead Valley by establishing transportation routes from the Clarks Fork River through the Flathead Lake Valley. White population in the Flathead Valley began to climb after the Northern Pacific Railroad reached Missoula in 1883.

In 1855, the Hellgate treaty had given the Kootenai, Flathead and upper Pend d'Oreille a single reservation, now known as the Flathead Indian Reservation. In 1887 the U.S. Congress passed a bill opening reservation lands to homesteading. In 1904 legislation was passed opening the Flathead Indian Reservation for non-indian settlement under an allotment system. In 1910 the President of the United States formally declared the unclaimed Indian allotment land to be open for homesteading. Additional allotments were made in 1917, 1928, and in the early 1930's. This practice was finally stopped in 1934 by the Wheeler-Howard Act, also known as the Indian Reorganization Act.

The 1930 census recorded a population of 9,541 in Lake County. The population continued to rise until it reached a plateau between 13,000 and 14,000 from 1940 to 1960. A slow rise in the 1970 census to 14,445 rapidly increased to 19,056 in 1980. The primary economic base for the Flathead and its communities has been agriculture and forest products. Railroad and lumber industries added to the regions economic base beginning around the turn of the century.

There are numerous historic structures within the corridor, primarily small farms or orchards, recreational cabins, and those classified loosely as community residential and commercial. Most will not be considered as eligible to the National Register of Historical Places although a small percentage may be recommended as eligible under various criteria.

MDT Library
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PROPOSED IMPROVEMENTS

The traffic and accident information collected and analyzed for this study were used to identify locations where improvements are needed to address safety or traffic flow problems throughout the east shore and west shore corridors. Most of these proposed improvements fall into the category of Transportation System Management (TSM), which includes minor cost projects designed to ensure safe and efficient used of the roadway system.

Recommended improvements include limited new construction in some areas to remove sharp curves, widen shoulders, or add uphill truck lanes on long hills. The recommendations include projects to improve safety at driveway approaches by relocating them or by removing brush or other obstacles to improve visibility near them. The recommendations also call for improvements to several major intersections, including adding turning lanes and traffic signals, where warranted.

Other proposed improvements include upgrading signs and pavement markings in some locations to warn drivers of potential hazards; clearing trees, brush, and other obstacles alongside roadways to improve snow melt and animal visibility; and constructing additional sidewalks and/or bicycle paths alongside the roadways to provide for these traveller's needs. Intelligent Vehicle Highway Systems solutions are recommended where feasible, to warn drivers about traffic problems, weather conditions, and roadway conditions.

In all, the study recommends 34 improvement projects with individual costs ranging from $500 to $850,000. The proposed improvements are intended to be accomplished over time. Some are required now, and others will become more important as traffic grows throughout the area. Additional major construction projects, similar to those completed on sections of US 93 in the last ten years, may also become necessary as populations and traffic levels increase throughout the Flathead Valley. As a result, a long-range corridor management process has also been recommended to plan and implement the needed changes.

CORRIDOR MANAGEMENT PLANNING

Effective planning for the Flathead Lake east shore and west shore highways is needed to ensure that a wide variety of concerns are addressed by any major roadway improvements. Recommended planning efforts are designed to build on the results of current planning and design projects for US 93 to the south and north of this project area. In addition the process will incorporate public opinions about east shore verses west shore commercial truck routing, desired locations for roadway improvements, and safegarding the quality of life in communities along the highways.

Any major highway construction in this area would involve complex issues and many potential impacts (and benefits) to adjacent landowners, communities, and the travelling public. As a result the planning effort is expected to begin with environmental analysis of issues and alternatives under the National Environmental Policy Act and the Montana Environmental Policy Act.

This process would identify those issues of greatest importance, and determine how best to meet transportation needs while minimizing undesirable consequences. Upon completion of an approved environmental analysis, the corridor management planning effort would continue through to implementation of desired improvements. The ongoing process would involve continuing public involvement. It would also involve pro-active planning efforts including corridor preservation, access control, coordination with local land use planning, and progressive implementation of programs and policies to reduce dependency on private autos for travel.

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